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ABSTRACT

This publication is an introductory guide to the identification of Chironomid (Midge) larvae. The larvae of these small flies are an important link in the food chain between algae and microinvertebrates. As a family, the larvae exhibit a wide range of tolerance to environmental factors such as amounts and types of pollutants. Much of this publication consists of photographs of the cleaned sclerotized head capsules of the common Chironomid genera. A total of 58 genera in four subfamilies are pictured. Several pictures are included for each genus and captions indicate magnification and identification characteristics. The general characteristics of the larvae, methods of preparing the head capsules for photography, a key to the subfamilies, a key to the genera, distinguishing head capsule characteristics, and a list of genera are presented. References are included. (MR)

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AN INTRODUCTION TO THE IDENTIFICATION OF CHIRONOMID LARVAE

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January, 1973

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AN INTRODUCTION TO THE IDENTIFICATION OF CHIRONOMID LARVAE

by

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PREFACE

Since its first printing in 1968, this guide has been reprinted twice; in 1969 and in 1970, with only slight alterations to the keys and figures. Recent publications on the systematics of Chironomidae including: keys to the Pentaneurini and Harnischia (Chironomini) complex of Florida by Beck and Beck (1966 and 1969, respectively); "A Classification of Nearctic Chironomidae" by Hamilton, Saether, and Oliver (1969); reviews of type specimens of Chironomidae housed in five North American museums by Sublette (1966, 1966, 1967, 1967, and 1970); descriptions of several Podonominae, Diamesinae, and Orthocladiinae by Saether (1969); and a monograph on the Tanypodinae of North America by Roback (1971) have contributed significantly to better definition of Nearctic genera. However, except for the former, these works deal primarily with the adults. Accordingly, the keys and figures of representative genera contained in this printing reflect the latest nomenclature for those groups that are fairly well described.

ACKNOWLEDGEMENTS

The technical reviews of this guide by the following chironomid taxonomists are greatly appreciated: Mr. William M. Beck, Department of Entomology, Florida A&M University, Tallahassee; Dr. LaVerne L. Curry, Department of Biology, Central Michigan University, Mt. Pleasant; Dr. Selwyn S. Roback, Curator, Department of Limnology, The Academy of Natural Sciences of Philadelphia. Dr. James E. Sublette, Dean, School of Graduate Studies, Eastern New Mexico University, Portales, in addition to reviewing the guide, graciously lent some of the specimens photographed.

Mr. J. B. Anderson, Deputy Director, and Dr. Cornelius I. Weber, Chief, Biological Methods, Analytical Quality Control Laboratory, National Environmental Research Center-Cincinnati, U. S. Environmental Protection Agency, offered valuable editorial suggestions. Other biologists who provided useful comments include: Maxwell A. Anderson, R. Douglas Kreis, Philip A. Lewis, George E. Morrison, Charles S. Polityka, Donald G. Stevens, Ralph M. Sinclair, and Lee B. Tebo, Jr.

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INTRODUCTION

Larvae of the dipteran family Chironomidae (midges) form a significant portion of the macroinvertebrate fauna in most freshwater habitats. They are an important link in the food chain between algae and microinvertebrates, and the larger macroinvertebrates and fish.

Biologists investigating lakes and streams have found that midge larvae of certain genera and species live with other macroinvertebrates in pollution-associated communities. Gaufin and Tarzwell (1952, 1955, and 1956), Paine and Gaufin (1956), and Gaufin (1958), Curry (1965), and Carr and Hiltunen (1965) have reported larvae that are able to live in waters with low dissolved oxygen concentrations. However, as a family, the larvae exhibit a wide range of tolerance to environmental factors and live in both "clean" and "polluted" waters. Therefore, in order to gain maximum information concerning the effects of pollution on the midge fauna, it is necessary to carry identifications beyond the family level.

This guide is intended to serve as a beginner's supplement to the more definitive descriptions of chironomid larvae by Johannsen (1934-37), Roback (1957), Curry (1961), Darby (1962), and Beck and Beck (1966), which take into account a variety of head and body characteristics for classification. Head capsules of various species are pictured to complement the keys to subfamily and genus, and to familiarize the beginner with structures that are used for identification.

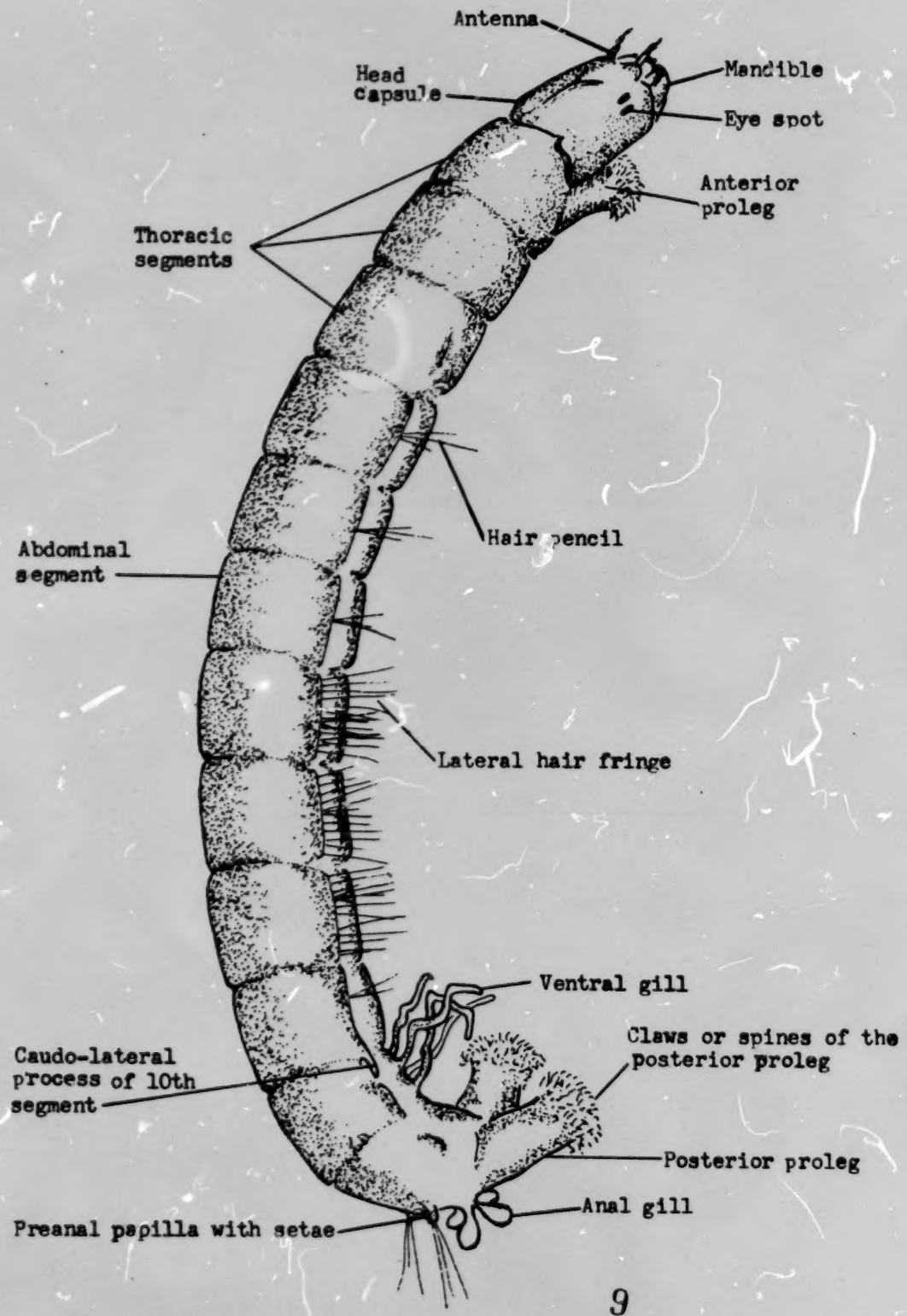
GENERAL CHARACTERISTICS

Chironomid larvae construct silken cases which are attached to sticks and stones, or build tubes in the bottom substrates of lakes and streams. The larvae may be various shades of yellow, green, and red when living. The wormlike appearance and large size of the red larvae (containing a hemoglobin, erythrocruorin) brought about the common name "bloodworm" for the larvae as a group. The term is a misnomer, but serves to bridge the gap between the layman and biologist.

The larvae range from only a few to over 20 millimeters (mm) in length. The head capsule is sclerotized and contains sensory structures and a feeding apparatus. Posterior to the head are 12 body segments. The first three segments become swollen before pupation and enclose the cephalo-thorax of the developing pupa. The general diagrammatic sketch of a chironomid larva (Figure 1) indicates some of these morphological characteristics.

The body is usually provided with scattered hairs, tufts, or hair fringes on the lateral margins. Paired prolegs are present on the first thoracic segment and on the last abdominal segment. The prolegs bear spines and/or claws clustered at their distal margins. Preanal papillae with setae are located dorsad on the last abdominal segment. The papillae may have a sclerotized area with a projecting

Figure 1. Schematic Drawing of A Chironomid Larva



"spur." Two to six anal "gills" are located between the preanal papillae and the posterior prolegs. These structures may be short and sausage-shaped, or long and attenuated.

The larvae of some Chironominae possess tubular "bloodgills" on the eleventh body segment which are thought to aid in respiration. In Chironomus and Goeldichironomus, these structures originate on the ventral surface usually in two coiled pairs (some Chironomus have only one pair). In some Glyptotendipes and Einfeldia they originate on the sides of the segment and are seldom longer than the posterior prolegs. In some Chironomus, short, tubular processes may also be present on the caudo-lateral margins of the tenth body segment. The size of the various "bloodgills" will vary with the instar stage of the larva (Hilsenhoff, 1966).

Subfamily Tanypodinae (Figure 2)

The larvae of this subfamily are distinguished by the fork-shaped lingua (=glossa), superlinguae (=paraglossa), and retractile antennae. These structures are embedded inside the head, and are best seen after the capsule has been cleared. The antennal ratio (AR) of the larva, or ratio of the length of the basal antennal segment to the remaining four segments combined, is often used to differentiate genera and species. There are no paralabial plates on the ventral side of the head capsule as in the Chironominae and some Orthocladiinae (Figures 3 and 4). Paralabial combs may be present

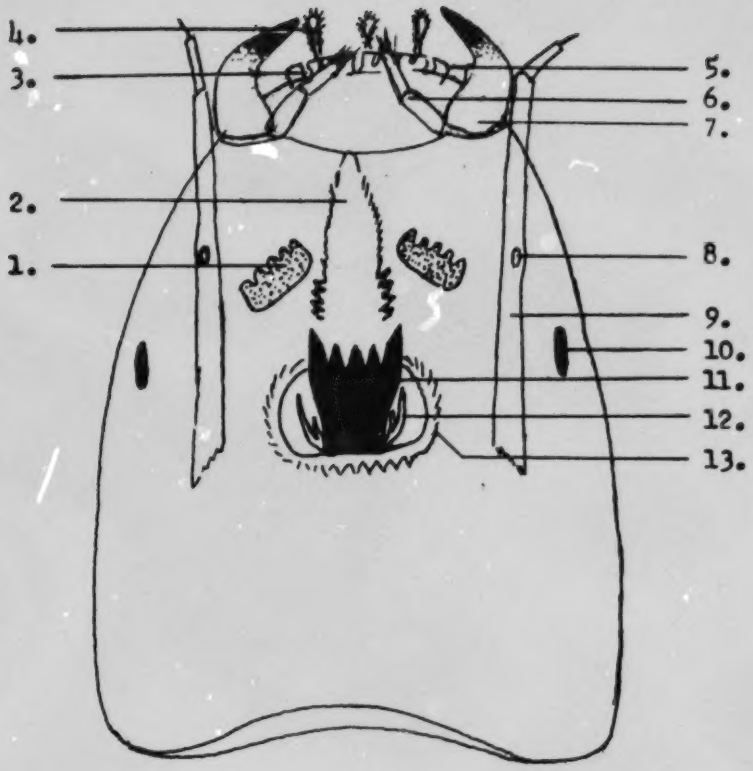


Figure 2. Schematic head capsule diagram of the Subfamily Tanypodinae (ventral view)

1. Paralabial comb(may be absent)
2. Labium
3. Sense vesicles of labrum
4. Clavate bristles of labrum
5. Labrum
6. Maxillary palpus
7. Mandible
8. Ring organ of antenna
9. Antenna (retractile)
10. Eye spot
11. Lingua of hypopharynx
12. Superlingua
13. Suspensorium of hypopharynx

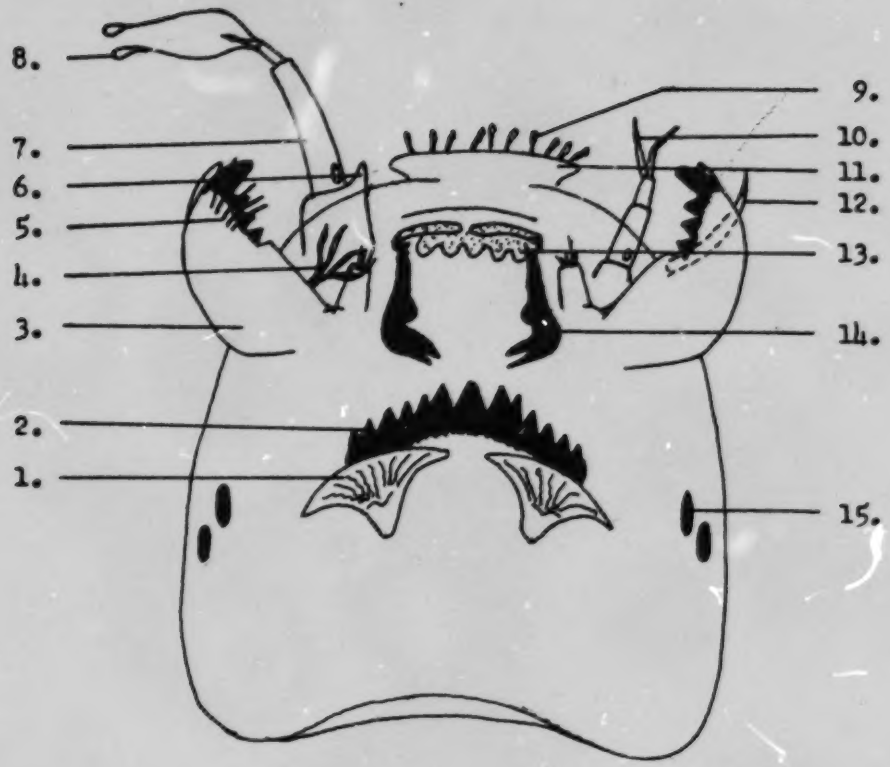


Figure 3. Schematic head capsule diagram of the Subfamily Chironominae (ventral view)

1. Striate paralabial plate
2. Labial plate
3. Mandible (note the dark lateral and light dorso-mesal teeth)
4. Mandibular brush
5. Preapical mandibular comb
6. Antennal tubercle with spur (Tanytarsini only)
7. Antenna on tubercle
8. Lauterborn organ on long petiole (Tribe Tanytarsini)
9. Papilla of labrum
10. Antennal blade
11. Labrum
12. Accessory teeth of mandible
13. Epipharyngeal plate
14. Premandible
15. Eye spot

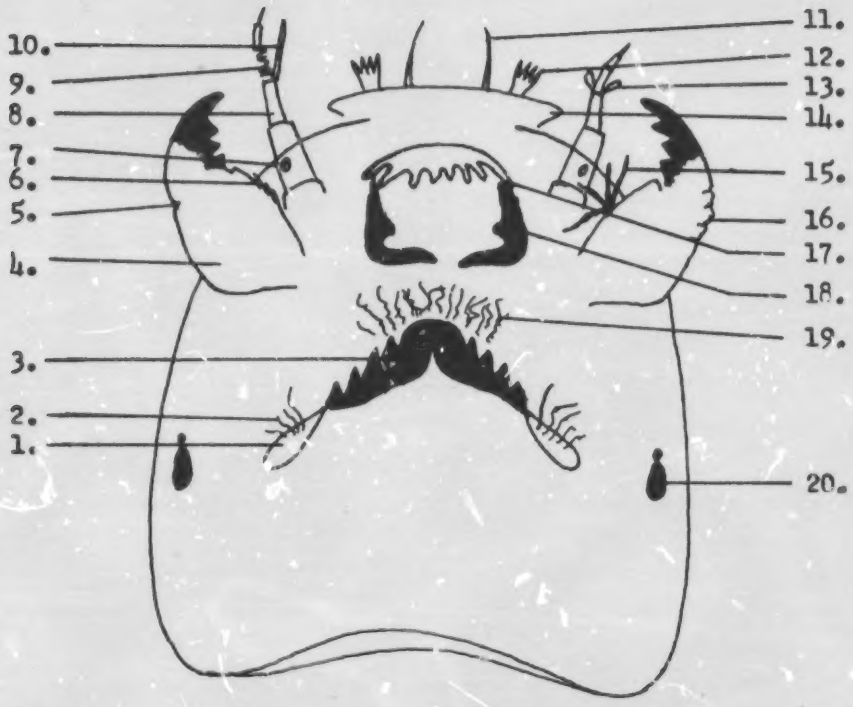


Figure 4. Schematic head capsule diagram of the Subfamilies Diamesinae and Orthocladiinae (ventral view)

1. Non-striate paralabial plate (may be absent or vestigial)
2. Paralabial hairs (beard)
3. Labial plate
4. Mandible
5. Concavity of mandible
6. Mandibular serration
7. Ring organ of antenna
8. Antenna
9. Annulated third antennal segment (Diamesinae only)
10. Antennal blade
11. Labral bristle
12. Labral spine
13. Lauterborn organ of antenna
14. Labrum
15. Mandibular brush
16. Mandibular crenulations
17. Finger processes of epipharynx
18. Premandible
19. Hypopharyngeal hair
20. Eye spot

in Procladius and some species of Anatopynini. The mandibles are characteristically scythe-shaped and usually do not have prominent lateral teeth. The number of basal segments of the maxillary palpi are used to separate genera and species. See Roback (1971) for full taxonomic treatment of the Subfamily.

Subfamily Chironominae (Figure 3)

All of the larvae possess a pair of striated, paralabial plates. However, in a few genera, e.g., Stenochironomus, the striations or punctations may be barely evident. The labial plate has teeth that project forward. The last lateral teeth of the labial plate may be partially covered by the paralabial plates. The mandibles are strong, and usually have dark, lateral teeth, a preapical mandibular comb, a large accessory tooth, and a filamentous brush on the inner basal margin. Also, spines (serrations) are sometimes present on the inner basal margin. The premandibles are usually bifid (ending in two blades) but may end in five or six blades.

The subfamily is divided into the tribes Tanytarsini and Chironomini. The Tanytarsini have long, curved, first antennal segments mounted on conspicuous tubercles. Except for a few genera, the paralabial plates are wider than long, and meet on the midline of the head capsule. Paired, leaflike structures, lauterborn organs, are mounted on either long or short petioles attached to the second antennal segment. The accessory tooth of the mandible is longer and more sharply pointed than in the Chironomini. In comparison, the antennal

tubercles of the Chironomini are inconspicuous, and the lauterborn organs are less prominent. Except for Xenochironomus, Pseudochironomus, and Lauterborniella, the paralabial plates are widely separated and do not meet on the midline of the head capsule.

Subfamily Orthocladiinae (Figure 4)

The larvae never possess striated paralabial plates as do the Chironominae. Some genera, however, have paralabial plates that are rugose or bear hairs. When present, the paralabial plates appear as oblong, caudo-lateral extensions of the labial plate or as vestigial structures. The shape and size of the lateral, mandibular teeth are extremely variable. There may be a mandibular brush and spines on the inner basal margin. The premandibles usually end in a single blade, but in some genera they are bifid. Generally, the teeth of the labial plates are arranged in an even, convex curve. In some genera, e.g., Psectrocladius, the lateral teeth of the labial plates are partially fused.

A branch of the Orthocladiinae are marine midges (recognized by some taxonomists as a separate subfamily Clunioninae). The larvae are restricted to intertidal rocks on seacoasts. Four genera are found on the coastline of California. The anal gills are absent and the antennae usually are three segmented. The median tooth is usually peaked. For further details see Wirth and Stone (1963).

Few larvae in this subfamily have been associated with adults. In some cases, it is not possible to carry the identification further than genus.

Subfamily Diamesinae (Figure 4)

Larvae of this subfamily closely resemble the Orthocladiinae. However, most species have annulated third antennal segments. Magnification at 1000 X is sometimes required to see the annulations.

Subfamily Podonominae (no figures or photographs)

The larvae have no premandibles. The hypopharynx has a conspicuous row of lamellar rods protruding forward, and the labial plate has an odd number of teeth (usually 15). The third antennal segment is annulated in some species (Brundin, 1966). Brundin (p. 95) states that members of this subfamily are distributed across northern North America and down into the Rocky Mountains of Colorado and Sierra Nevada of California. However, the fauna in the United States is poor, consisting of only five genera and 18 species.

METHODS

The head capsule or entire body (depending on the size of the larva) was placed in a crucible containing 5-10% KOH solution and heated until the muscle tissue was digested. The cleared specimens were rinsed in distilled water, transferred to absolute alcohol and

mounted on a slide, ventral side up, in Turtox[1] Diaphane*. The coverslips were pressed gently with a lead pencil eraser to better expose the parts necessary for identification.

The photographs of the head capsules were taken with Kodak[1] Panatomic X film using a Zeiss[1] photomicroscope.

The classification scheme of Roback (1971) was used for the Tanypodinae, Hamilton, et al. (1969) was used for the Chironominae, Diamesinae, and for most Orthocladiinae. Sublette and Sublette (1965) is a useful reference for translating synonymous nomenclature for midges based on Meigen's publication in 1800 using the name Tendipes (Tendipedidae) and his 1803 publication using the name Chironomus (Chironomidae) for the same insect. The Plenary Powers of the International Commission on Zoological Nomenclature in Opinion 678, 1963 suppressed the pamphlet published by Meigen in 1800.

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* Diaphane is no longer available. Euparol is a suitable substitute.

[1] Mention of commercial sources does not constitute endorsement by the U. S. Environmental Protection Agency.

Key to the Subfamilies of Chironomidae

1. Head capsule with a fork-shaped lingua; antennae retractile into sheaths embedded inside the head (Fig. 5).... Tanypodinae
   Head capsule without fork-shaped lingua; antennae not retractile..... 2

2. Premandibles absent..... Podonominae
   Premandibles present (Fig. 6)..... 3

3. Paralabial plates usually with striations, rarely with punctations, and oriented transversely on head (Fig. 6)..... Chironominae
   Paralabial plates, if present, without striations, but may be rugose or bear hairs; oriented more longitudinally on head (page 70)..... 4

4. Third antennal segment usually annulated (Fig. 7). Diamesinae
   Third segment without annulations (Fig. 8)..... Orthocladiinae

Figure 5. Tanypodinae

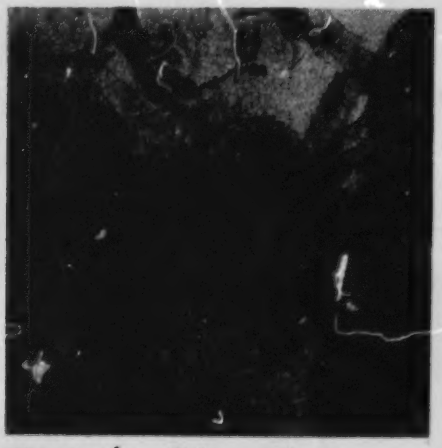

Figure 6. Chironominae

Figure 7. Diamesinae

Figure 8. Orthocladiinae

KEY TO COMMON GENERA

Subfamily Tanypodinae

1. Paralabial combs present (page 32) 2
   Paralabial combs absent 4

2. Lingua with 4 equal teeth; mandible with 4-5 teeth on the inner shoulder (page 33) ..... Psectrotanypus
   Lingua with 5 teeth 3

3. Lingua with subequal, light teeth (page 29) .....Tanypus
   Lingua with black teeth; middle tooth shortest (page 32) .... Procladius

4. Lingua with 6 teeth (not pictured) ..... Clinotanypus
   Lingua with an odd number of teeth 5

5. Lingua with 7 light teeth (page 34) ..... Coelotanypus
   Lingua with 5 dark teeth; the inner 3 sometimes with light tips .....Tribe Pentaneurini 6

6. More than one basal, palpal segment (page 31) .. Ablabesmyia
   One basal, palpal segment ..... Other Pentaneurini

Subfamily Chironominae

Tribe Tanytarsini: antennal tubercles prominent, as long as wide or longer; 1st antennal segment long and curved 22
Tribe Chironomini: antennal tubercles much wider than long; 1st antennal segment not long and curved 1

1. Antennae with 5 segments..... 2
   Antennae with 6 segments..... 18

2. Paralabial plates nearly touch on the midline (page 46)..... 3
   Paralabial plates distinctly separated..... 4

3. Paralabial plates about 3 times wider than long and pointed at the inner apices; lateral teeth of mandibles low and indistinct (page 46)..... Xenochironomus (Anceus)
   Paralabial plates about 4 times wider than long and rounded at inner apices; lateral teeth of mandibles large and distinct (page 52)..... Pseudochironomus

4. Labial plate concave with 10 low, rounded, black teeth; paralabial plates indistinct (page 56)..... Stenochironomus
Labial plate otherwise..... 5

5. Labial plate with an odd number of teeth..... 6
Labial plate with an even number of teeth..... 14

6. Middle tooth wide and light, flanked by oblique rows of darker lateral teeth (page 40) ..... Cryptochironomus
Middle tooth of labial plate as dark as laterals or if lighter then laterals not oblique..... 7

7. Labial plate with 15 teeth 8
Labial plate 11 - 13 teeth; middle tooth may be simple, or trifid (deeply notched) appearing as 3 separate teeth (page 35) 9

8. Middle tooth of labial plate dark and smaller than 1st laterals and notched on its dorso lateral margins; accessory tooth of mandible fringed (page 44) ..... Endochironomus
Middle tooth of labial plate larger than 1st laterals, may be notched medially; paralabial striations may be recurved.....
..... (page 41) Parachironomus
..... (page 43) Paracladopelma

9. Middle tooth of labial plate low, 1/3rd wider at base than long, rounded and not longer than 1st laterals; 11th body segment without ventral bloodgills, a small pair may be present on the sides of the 11th body segment (page 49) .....
..... Glyptotendipes
Middle tooth as long as wide at its base, curving evenly to apex; may be simple, have lateral notches, or be completely trifid 10

10. Middle tooth of labial plate completely trifid or with deep notches at its base; 11th body segment usually with 2 pairs of ventral bloodgills; tubular caudo-lateral processes may be present on 10th body segment (page 35) ..... Chironomus
Middle tooth simple; lateral notches may be present midway of its length 11

11. Middle tooth at labial plate with deep, posteriorly directed notches, midway of its length; usually with a median node; epipharyngeal plate with 15 to 20 teeth 12
Middle tooth curving evenly to apex and may have shallow, lateral notches midway of its length; epipharyngeal plate with 3 to 5 rounded teeth 13

12. Second lateral teeth of labial plate with flanges, mandibles with a mesal tooth perpendicular to the lateral teeth; premandibles abruptly curved, ending in 2 blades; 2 pair of bloodgills (page 48) .... Goeldichironomus
Labial plate and mandibles not as above; premandibles ending in 5 blades; 1 pair of bloodgills (page 37) .... Kiefferulus

13. The 3rd lateral tooth of mandible unequally compound; 5th and 6th lateral teeth of labial plate fused; 11th body segment with 1 pair of ventral bloodgills (page 36) .... Einfeldia
Third lateral tooth of mandible equally compound or simple; 5th and 6th laterals not fused; no bloodgills on 11th segment (page 38)..... Dicrotendipes ..... (page 51) ..... Glyptotendipes senilis

14. Labial plate with a cleft median tooth (appearing as 2 teeth); laterals sharply pointed and equal in length; premandibles with 4-5 blades (page 42)... Parachironomus

Labial plate not as above; premandibles with two blades..... 15

15. Labial plate with middle and 2nd lateral teeth nearly even in height and longer than 1st laterals; inner margin of mandibles may have serrations; anal gills attenuated and constricted at the middle (page 53) .... Polypedilum
Labial plate with 1st and 3rd laterals longer than 2nd laterals; middle 4 teeth projecting above other laterals 16

16. Middle teeth and 1st laterals cleft equally deep; paralabials coarsely striate (page 45) ..... Tribelos
Middle teeth with cleft not as deep as 1st laterals 17

17. Middle teeth of labial plate pointed and even with 1st laterals; accessory tooth of mandible straight (page 54)..... ..... Phaenopsectra
Middle teeth of labial plate more rounded and smaller than 1st laterals; accessory tooth of mandible curved at tip (page 54) ..... Endochironomus

18. Labial plate with 13 teeth; middle tooth wide and light; laterals dark and not higher than middle tooth (page 55) ..... Paralauterborniella
Labial plate with an even number of teeth 19

19. Labial plate with 12 or 14 teeth; middle pair of teeth lighter than laterals 20
Labial plate with 16 teeth; middle pair of teeth may be lighter than laterals 21

20. Antennae about as long as mandibles; paralabial plates distinctly separated on midline (page 60).. Microtendipes
Antennae about twice as long as mandibles; paralabial plates meet on the midline (page 56).... Lauterborniella

21. Middle 4 teeth of labial plate lighter than laterals; 3rd laterals longest (page 58)..... Paratendipes
All teeth of labial plate unicolorous, middle 4 teeth projecting above 2nd laterals; striations of paralabial plates indistinct (page 59)..... Stictochironomus

Tribe Tanytarsini

22. Paralabial plates pointed at inner apices and clearly separated (page 62) ..... Constempellina
Paralabial plates blunt at inner apices and meet at the midline of the head capsule 23

23. Antennal tubercles with a spur; petioles of lauterborn organs approximately 3X the length of the last 3 antennal segments (page 63) ..... Micropsectra
Antennal tubercles without a spur; petioles of lauterborn organs shorter (page 61) ..... Rheotanytarsus, Paratanytarsus, Calopsectra, Tanytarsus, and Cladotanytarsus

Subfamily Diamesinae (3rd antennal segments sometimes annulated)

1. Labial plate with odd number of teeth; middle tooth may be rounded and lighter than laterals (page 64)..... Diamesa
   Labial plate with even number of teeth or some teeth indistinct. 2

2. Labial plate undulated and smooth, teeth lacking; premandibles fan-shaped (page 65)..... Potthastia
   Labial plate convex and some teeth evident..... 3

3. Premandibles with 5-7 blades; teeth of labial plate covered by paralabials; middle teeth fused, (page 66)..... Pseudodiamesa
   Premandibles with 1 blade; teeth of labial plate bare, middle teeth widely separated; paralabials large and crescent-shaped (page 67)..... Monodiamesa

Subfamily Podonominae (See text, p. 10)

Subfamily Orthocladiinae

1. Antennae at least 1/2 as long as head, or longer 2
   Antennae shorter usually about as long as the mandibles 3

2. Labial plate with an odd number of teeth; middle tooth shorter than 1st laterals; 2nd and 3rd antennal segments dark (page 86) ..... Thienemanniella and Corynoneura
   Labial plate with an even number of teeth; a distinctive gap between the middle teeth; antennal segments never dark (page 75) ..... Brillia

3. Labial plate with an odd number of teeth 4
   Labial plate with an even number of teeth 12

4. Teeth of labial plate low and even in length; middle tooth 1/3 the width of plate and broadly truncate; 11 black teeth (page 76) ..... Cardiocladius
   Labial plate not as above 5

5. Middle tooth of labial plate much smaller than, and recessed between, the large 1st lateral teeth (page 74) .... Brillia
   Middle tooth as long as the 1st lateral teeth 6

6. Labial plate with middle tooth or teeth distinctly lighter than laterals, or middle tooth peaked 7
   Labial plate with all teeth unicolorous; middle tooth not peaked 9

7. Labial plate truncate with an even row of 4-7 small, light teeth projecting above dark laterals (not pictured) .... Smittia
   Labial plate not truncate 8

8. Middle tooth of labial plate dome-shaped and/or peaked
(page 72).....Eukiefferiella
(page 78).....Psectrocladius
Middle tooth not dome-shaped; mandibles with serrations
(page 83)..... Cricotopus

9. Outer edge of mandibles crenulated (crenulations may be fine) (page 84) ..... Cricotopus
Outer edge of mandibles without crenulations 10

10. Third antennal segment 1/7th the length of the 2nd segment; labial plate with 9 or 11 teeth (page 73).Smittia
Third segment closer to 1/4 to 1/2 the length of the 2nd segment 11

11. Labial plate with 7, 11, or 13 teeth (if 11, the 1st laterals are notched); mandibles may have serrations on inner margins and the inner shoulder is dark with a projecting point; premandibles simple or bifid; lateral hair tufts may be present on some of the body segments (page 83) ..... Cricotopus
Labial plate with 13, 17, and 19 teeth that curve in an even convex arc; mandibles without serrations; premandibles simple; body without hair tufts (page 68) .....
..... Orthocladius

12. Middle teeth of labial plate fused into a clear, wide tooth, often with 2 dark, closely separated tips near the center of the plate; lateral teeth dark and nearly fused; paralabial plates present; mandibles scythe-shaped (page 77) ..... Psectrocladius
Middle teeth of labial plate as dark as laterals 13

13. Labial plate with 10-12 teeth 14
Labial plate with 14 teeth 18

14. Labial plate with 10 teeth; middle pair fused almost their entire length and greatly elongated (page 71) .....
.....Eukiefferiella
Labial plate with 12 teeth 15

15. Labial plate with black teeth; middle pair largest and not fused; antennae 6-segmented (page 80)... Heterotrissocladius
Middle teeth of labial plate brown, partially fused or narrowly separated; paralabial plates may be present 16

16. Middle teeth of labial plate fused almost their entire length and elongated; paralabial plates without hairs (page 79)..... Psectrocladius
Middle teeth not elongated; may be fused at base 17

17. Middle teeth of labial plate spadelike ; paralabial plates with hairs; mandibles without serrations (page 70) ..... Trichocladius
Middle teeth rounded and narrowly separated; paralabial plates absent; mandibles with serrations or a long, flat, wide filament on inner margins (page 71) .....
.....Eukiefferiella

18. Middle 4 teeth of labial plate light and even in height, shorter than 2nd laterals (page 81) ..... Metriocnemus
Middle 4 teeth dark or all teeth relatively even in height 19

19. Paralabial plates crescent-shaped and with hairs; mandibles dark at least 1/2 of their length (page 82) .....
..... Diplocladius
Paralabial plates not crescent-shaped and hairs absent; mandibles dark only near the tips (page 69) .....
..... Trissocladius

DISTINGUISHING HEAD CAPSULE CHARACTERISTICS

Family Chironomidae

Subfamily Tanypodinae (approximately 38 genera; 5 pictured)

Tanypus: The lingua has 5 light teeth that are nearly equal in length. Paralabial combs are present with short, stubby teeth. The antennae are about 1/3 as long as the head capsule and the basal portions of the mandibles are robust.

Tribe Pentaneurini (represented by Ablabesmyia): The lingua has 5 pointed, dark teeth; the middle 3 sometimes with light tips. Paralabial combs are absent. The antennae are about 1/2 as long as the head capsule. For specific determinations consult Beck and Beck (1966).

Procladius: The lingua has 5 black teeth. Paralabial combs are present. The antennae are about 1/4 as long as the head capsule.

Psectrotanypus: The lingua is short and thick with 4 stubby teeth. Paralabial combs are present. Each mandible has approximately 5 prominent lateral teeth near the inner shoulder.

Coelotanypus: The lingua has 7 light teeth. Paralabial combs are absent. However, there are 2 rows of chitin points in the hypopharynx.

Subfamily Chironominae

Tribe Chironomini (approximately 30 genera; 21 pictured)

Chironomus: The labial plate has 13 dark, pointed teeth and the middle tooth completely trifid, or deeply notched near its base. The premandibles are bifid. Each mandible has a dark, terminal tooth, a light dorso-mesal tooth, and usually 3 sharply-pointed, dark lateral teeth (in some species the 3rd lateral tooth is light). The epipharyngeal plate has approximately 15 to 20 sharp teeth. Usually there are 2 pairs of ventral bloodgills, and a tubular process may be present on each caudo-lateral margin of segment 10.

Einfeldia: The labial plate has 13 dark teeth and is quite similar to that of Dictrotendipes, except that the 5th and 6th lateral teeth are fused and the plate is deeply indented on its basal, lateral margins. The mandibles are deeply indented at the inner shoulders and the 3rd lateral tooth is unequally compound.

Kiefferulus: The distinctive labial plate of this genus appears to be intermediate between those of Dicrotendipes and Chironomus. The middle tooth is not trifid but has deep, lateral notches directed posteriorly about 1/3 of the distance from its peaked apex. There is 1 pair of ventral bloodgills. The premandibles end in 5-6 blades.

Dicrotendipes: The labial has 11 to 13 teeth; the middle tooth may appear simple in mature larvae, but is notched midway of its length in early instars. The mandibles are similar to those of Chironomus except the lateral teeth are more rounded and not as sharp. In Dicrotendipes nervosus the 3rd lateral tooth of the mandible is equally compound. The head capsules of some species have a dark, median stripe, dorsally. The premandibles are bifid. The epipharyngeal plate usually has 5 rounded teeth.

Cryptochironomus: The labial plate always has an odd number of teeth; the middle tooth is light, wide, and rounded, and is flanked by oblique rows of darker lateral teeth. In the Harnischia complex (Beck and Beck, 1969), teeth are relatively even in length; the last 2 or 3 lateral teeth are as long as the inner laterals and appear upturned. The premandibles are bifid or palmate, ending in 3-5 blades.

Endochironomus: The labial plate has 15 or 16 dark teeth. In the species with 15 teeth, the middle tooth is low and rounded, with dorso-lateral notches; the 4th lateral teeth are smallest; in the species with 16 teeth, the labial plates are quite similar to Tribelos and Phaenopsectra in that the 4 middle teeth project above the laterals.

Tribelos: The labial plate has 16 dark teeth; the middle teeth are slightly shorter than the 1st lateral teeth; the 2nd lateral teeth are shorter than the 3rd lateral teeth. The antennae have 5 segments, in contrast to the 6 segmented antennae of Stictochironomus. Hamilton, et al. (1969) recognize Tribelos as a subgenus of Phaenopsectra.

Xenochironomus: The labial plate in most mature larvae has even, low rounded teeth. The paralabial plates touch at the midline. The lateral teeth of the mandibles are barely apparent. In X. xenolabis, the labial plate has alternating large and small teeth in the immature larva, but the small teeth are not present in the mature larva. The paralabial plates are close but do not touch at the midline. For specific determinations consult Roback (1963).

Goeldichironomus: The labial plate has 13 teeth; the middle tooth with deep lateral notches and the apex with a median node. The 2nd lateral teeth have light lateral flanges and the premandibles are curved abruptly and end in 2 short, subequal blades. The mandible has a mesal tooth perpendicular to the lateral teeth and a long accessory tooth. The species pictured is synonymous with C. fulvipilus.

Glyptotendipes: The labial plate has 13 teeth. In mature larvae the middle tooth, characteristically, is low and broadly rounded or squared with minute dorso-lateral notches, and shorter than the 1st lateral teeth. G. senilis is an exception. The middle tooth is slightly longer than the 1st lateral teeth and is notched midway of its length as in Dicrotendipes. G. senilis was described by Johannsen (1937b) and figures were presented by Roback (1957).

Pseudochironomus: The labial plate has 9 or 11 teeth; the middle tooth low and rounded; the 2nd lateral teeth are smallest; the species pictured (P. fulviventris) has bifid 5th lateral teeth. The paralabial plates are approximately 4 times as wide as long and nearly touch at the midline.

Polypedilum: The labial plate has 16 teeth; generally the middle and 2nd lateral teeth are the largest and the 1st lateral teeth are small. In one species, P. fallax, the teeth gradually decrease in height from the center of the plate forming an arc.

Phaenopsectra: The labial plate has 16 teeth. The middle teeth are the same length as the 1st laterals. The mandibles have at least 3 lateral teeth. This genus is discussed in Johannsen (1937b) as Pentapedilum and in Roback (1957) as Tanytarsus (Tanytarsus) obediens.

Paratendipes: The middle 4 teeth of the labial plate are lighter than the lateral teeth and are shorter than the 3rd laterals which give the middle of the plate a concave appearance. The labial plate has 16 teeth and the antennae are 6-segmented.

Paralauterborniella: The labial plate has 13 teeth; the middle one broad and dome-shaped, and lighter than the laterals. Laterals not oblique as in Cryptochironomus. The antennae have six segments.

Stenochironomus: The labial plate has 10 low, rounded black teeth arranged in a concave manner. The paralabial plates are indistinct causing confusion as Orthocladiinae. Antennae have 5 segments.

Stictochironomus: The labial plate has 16 teeth; the middle 4 teeth projecting; the 1st and 3rd lateral teeth are largest. The mandibles have serrations on their inner margins and the outer margins are distinctly flattened. The antennae have 6 segments.

Microtendipes: The labial plate has 14 teeth; the 2 middle teeth are light; the 1st lateral teeth are shorter than, and are fused to, the 2nd laterals.

Tribe Tanytarsini (Approximately 30 genera; 3 pictured)

Rheotanytarsus: As in Tanytarsus, Paratanytarsus, Cladotanytarsus, and Calopsectra, this genus has antennae mounted on prominent tubercles. There is no "spur" on the tubercle. The paralabial plates meet on the midline and are truncate at either end. The labial plate has 11 teeth, and the middle one may be notched on either side near the apex. In the larvae, the genera can be separated by the size, shape, and location of lauterborn organs (See Roback, 1957).

Constempellina: The antennal tubercles have projections (spurs), and the paralabial plates are pointed at the inner apices and widely separated. Stempellina, a genus similar in appearance, has the lauterborn organs opposite on the apex of the 2nd antennal segment, whereas in Constempellina they are separated; one at the base and the other at the apex of the 2nd segment.

Micropsectra: The anterior margin of the antennal tubercles has long spurs. The paralabial plates meet at the midline. The petioles of the lauterborn organs are three times as long as the combined length of the last 3 antennal segments. The petioles are fragile and easily destroyed. Magnification at 400X is usually required to see details of the lauterborn organs.

Subfamily Diamesinae (approximately 9 genera; 4 pictured)

Diamesa: The paralabial plates are lacking. The labial plate has an odd number of teeth. The middle tooth is lighter than the laterals and the premandibles end in one blade. The mandibles have four lateral teeth gradually decreasing in size.

Potthastia: The paralabial plates are lacking. The labial plate is light, undulated and apparently no teeth are present. The premandibles are distinctively fan-shaped for the species shown. The mandibles are scythe-shaped and the lateral teeth are reduced.

Pseudodiamesa: The paralabial plates are expanded forming a thin transparent shield over lateral teeth of the labial plate. The premandibles have 5 to 7 blades. The lateral teeth of the mandibles are grouped near the shoulder.

Monodiamesa: The paralabial plates are large and crescent-shaped. The middle teeth of the labial plate are largest and widely separated. The premandibles are simple, and the lateral teeth of the mandibles are grouped near the shoulder.

Subfamily Podonominae (5 genera; none pictured)

Subfamily Orthocladiinae (approximately 45 genera; 12 pictured)

Orthocladius: Generally, the labial plate is evenly convex in appearance with 13 teeth and the premandibles end in 1 blade. Paralabial plates are reduced or absent. The antennae are short, robust, and lauterborn organs large and rounded.

Trichocladius: The labial plate has 14 teeth; the middle pair are spade-like and project above the 1st laterals, which are the smallest teeth of the labial plate. The paralabial plates are conspicuous and some species have delicate hairs on the paralabials. The premandibles are simple. Brundin (1959) recognizes five genera (based on adults); Rheocricotopus, Paracricotopus, Microcricotopus, Acricotopus, and Syncricotopus. Johannsen (1937, Part III) gives keys to the larvae.

Eukiefferiella: The labial plate may have 10, 11, or 12 teeth; the middle teeth are projecting and narrowly separated. The mandibles of some species have serrations, or a long, filamentous projection on the inner basal margin.

Smittia: The labial plates are variable in the number and shape of the teeth. In some species the labial plate is truncate, with light teeth across the apex (Roback,1957). The species pictured has 11 teeth in the labial plate, the middle tooth is largest. The premandibles are bifid, and the antennal blade is stout.

Brillia: The labial plate has 12 or 13 teeth; in the species with 13 teeth the middle tooth is much smaller than the first lateral teeth. The premandibles are bifid or end in a single blade. The antennae are approximately 1/2 as long as the head capsule. The mandibles have a concavity on the outer margin. Brillia par has 12 teeth and the middle teeth are spaced widely apart.

Cardiocladius: The labial plate has 11 teeth; the middle tooth is broad, truncate, and approximately 1/3 the width of the plate. The mandibles are heavy and dark. The dorsal, posterior margin of the head capsule has a wide, dark margin, and deep, medial notch.

Psectrocladius: The labial plates may have an even or odd number of teeth but characteristically the lateral teeth of the labial plate are partially fused. The middle teeth are light and wide with small, dark projecting tips, or are as dark as the lateral teeth and project distinctly (Sublette, 1964). In those species with an odd number of teeth, the middle tooth is wide, light, and dome-shaped. The mandibles characteristically are scythe-shaped with a long, dark-tipped apical tooth, and 3 or 4 lateral teeth close-set near the inner shoulder. The premandibles are curved sharply and end in one blade.

Heterotrissocladius: The labial plate of Nearctic specimens has 12 black teeth; the middle pair largest. The mandibles are strong and heavy in appearance, and dark nearly 1/2 of their length. The antennae are six-segmented.

Diplocladius: The labial plates have 14 teeth, all nearly even. Large bristles are located near the inner posterior margin of each paralabial plate. The mandibles are dark nearly 2/3 of their length.

Cricotopus: The labial plate has 11 or 13 teeth; the middle tooth curves evenly or is slightly flattened and the 1st lateral teeth are sometimes notched. The mandibles may be crenulated on their outer margins or serrated on the inner basal margins. The premandibles are bifid or end in a single blade. Some species have hair pencils (tufts) on the sides of the body segments (see Figure 1).

Thienemanniella: The labial plate has 13 teeth; the middle tooth is much smaller than the 1st laterals. The lateral teeth are arranged in a 45° angle from the apex of the labial plate, making the plate appear narrow. The larvae are easily distinguished from other Orthocladiinae by the elongated antennal segments, which are nearly as long as the head capsule. The first and second antennal segments are dark. The posterior prolegs bear dorsal "spines" (pointed hairlike structures) that are used for specific identifications. Another genus, Corynoneura, is similar in appearance except that the antennae are nearly two times the length of the head capsule.

Metriocnemus: The labial plate has 14 teeth; the middle four are short and stubby, and smaller than the 2nd laterals. The paralabial plates are apparently lacking. The premandibles are bifid, and the four lateral teeth of the mandibles are arranged in gradual decreasing order. The accessory tooth of the mandible is pointed and long, reaching the base of the 2nd lateral tooth of the mandible.

Trissocladius: The labial plate has 14 teeth; the middle 4 may be smaller and somewhat lighter than the lateral teeth. Paralabial plates are present. The premandibles are bifid.

Genera Pictured

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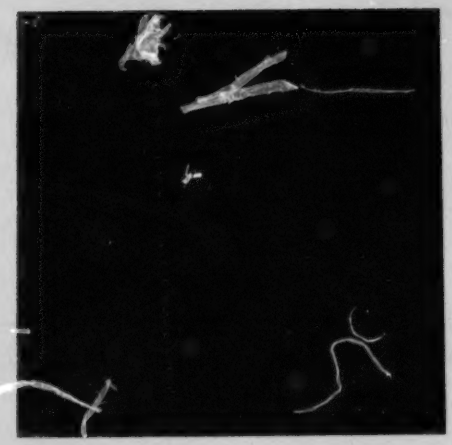
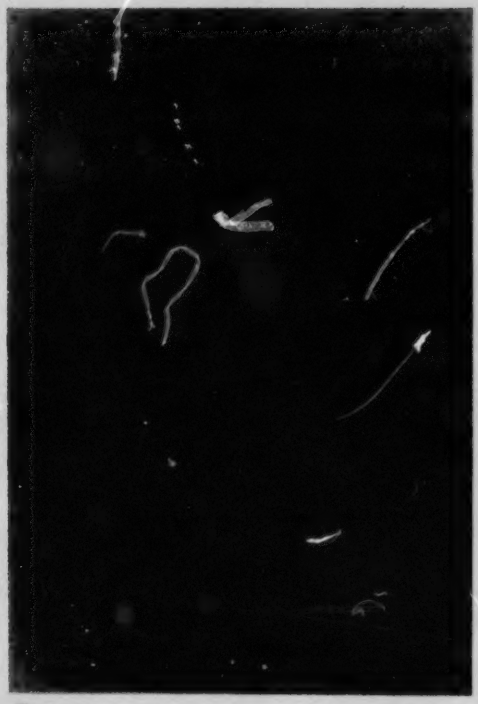
Tanypodinae



Tanypus sp.
View of Head X75



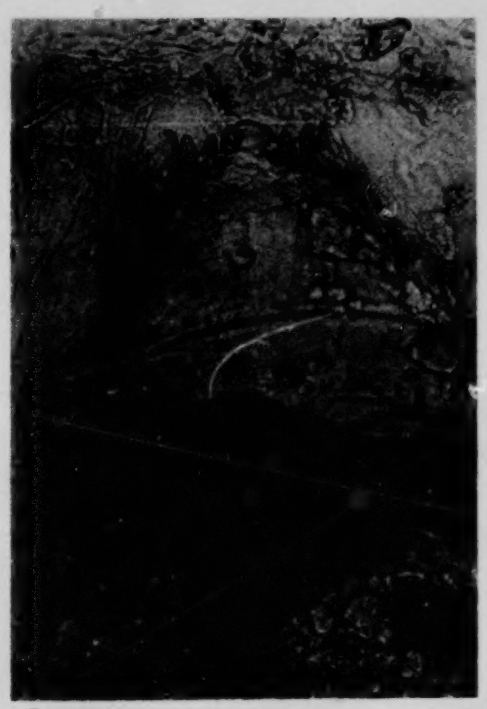
Tanypus sp.
Lingua, mandibles, and antenna X300

Tanypus sp.
Lingua X480 Note 5 light teeth

Tanypus sp.
Paralabials X480

Tanypodinae

Tanypus sp.
View of Head X75



Tanypus sp.
Paralabials X300

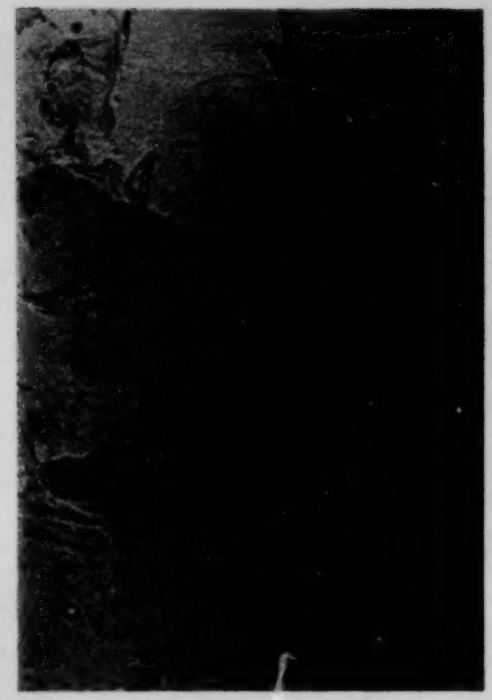
Tanypus sp.
Lingua X480

Tanypus sp.
Mandible X480
Note the inflated basal portion

Tanypodinae
Tribe Pentaneurini

Ablabesmyia sp.
View of Head X75

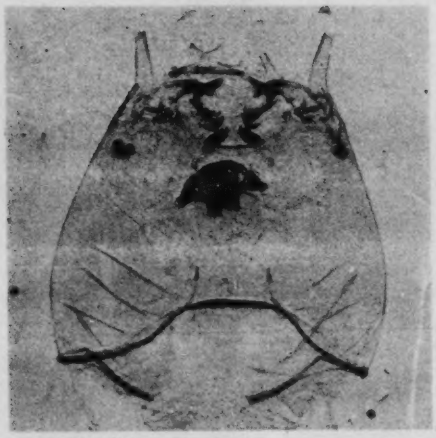
Ablabesmyia sp.
Ensheathed antenna, mandible, and maxillary palp X190



Ablabesmyia sp.
Lingua and superlingua X300

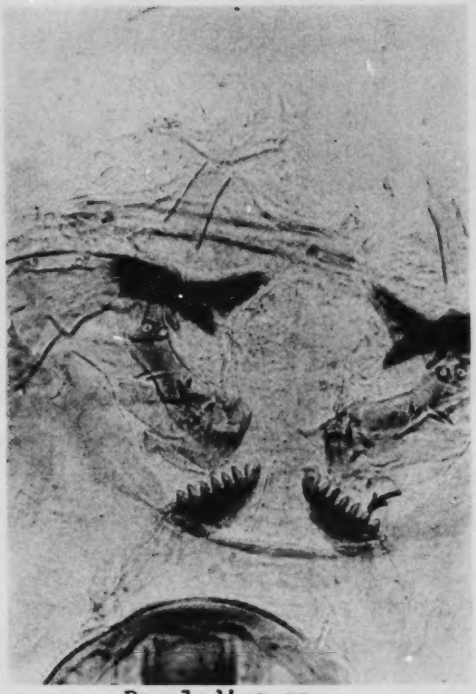
Note: Morphological differences in the head structures of the Pentaneurini are associated with other body characteristics to differentiate genera; consult Beck and Beck (1966)

Tanypodinae



Procladius sp.
View of Head X75

Procladius sp.
Lingua X300 Note 5 dark teeth



Procladius sp.
Paralabial combs X190

Tanypodinae

Psectrotanypus sp.
View of Head X190

Psectrotanypus sp.
Lingua and mandible X480
Note 4 light teeth of lingua and
large lateral teeth on mandible

* Specimen in the collection of Dr. Sublette

Tanypodinae

Coelotanypus sp.
View of Head X190

Coelotanypus sp.
Lingua X480 Note 7 light teeth

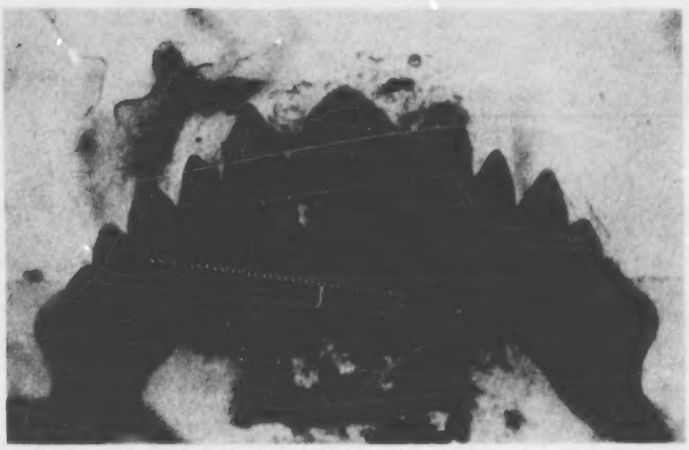
Chironominae
Tribe: Chironomini

Chironomus sp.
View of Head X75

Chironomus sp.
Labial plate, paralabials, mandible, and antennae X190
Note the trifid middle tooth of the labial plate

Chironominae
Tribe Chironomini

Einfeldia sp.
View of Head X190 Note the extreme indentations on the mandibles and labial plate; the almost fused 5th and 6th laterals



Einfeldia sp.
Labial plate X480

*Correspondence with Dr. Roback (August 1967)

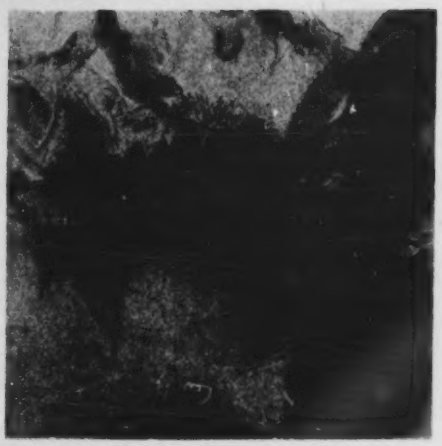
Chironominae
Tribe: Chironomini

Kiefferulus sp.
View of Head X75

Kiefferulus sp.
Epipharyngeal area, labial plate, and mandible X300 Note the deep, lateral notches on the middle tooth of the labial plate; the premandible has 6 blades; the maxillary palpus is indicated by an arrow

Chironominae
Tribe: Chironomini

Dicrotendipes nervosus
View of Head X75



Dicrotendipes nervosus
Labial plate and paralabial plates X190

Dicrotendipes nervosus
Labial plate and mandible
X300 Note the equally compound 3rd lateral tooth of the mandible

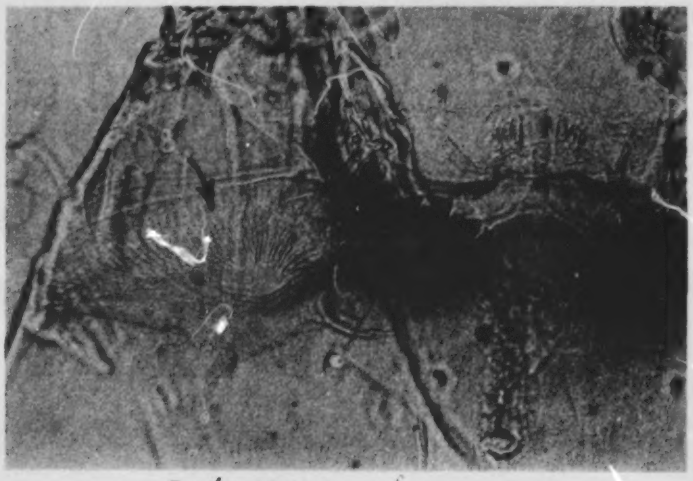
Chironominae
Tribe Chironomini

Dicrotendipes modestus
Labial plate and mandibles X300

Dicrotendipes modestus
Labial plate X480 Note the simple middle tooth and the almost fused 1st and 2nd laterals

Chironominae
Tribe: Chironomini

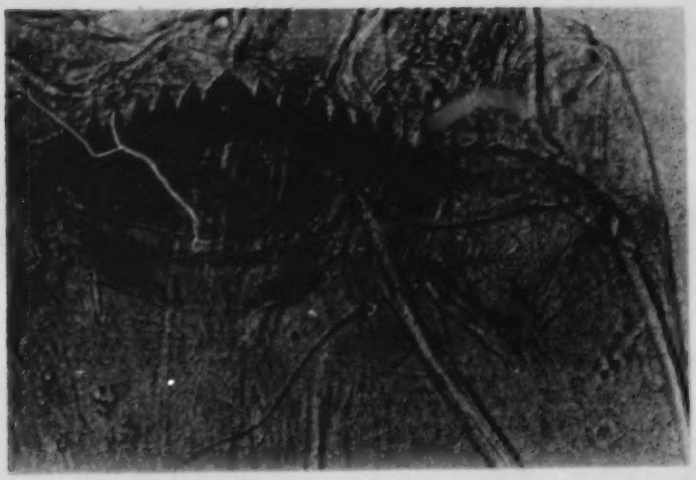
Cryptochironomus sp.
View of Head X190 Note the wide, light, middle tooth of the labial plate flanked by oblique laterals



Cryptochironomus sp.
Labial plate and paralabial X480

Chironominae
Tribe: Chironomini

Parachironomus sp.
View of Head X480



Parachironomus sp.
Labial plate and paralabial X480
Note the recurved striations on the paralabial plate and the large, peaked middle tooth of the labial plate

Chironomidae
Tribe Chironomini

Parachironomus sp.
View of Head X190

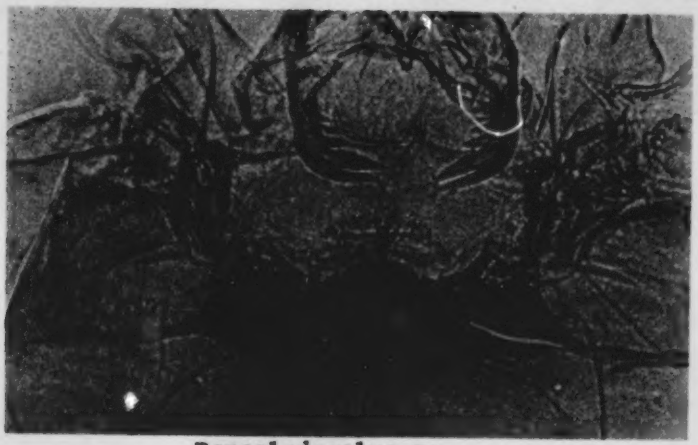
Parachironomus sp.
Labial plate and premandible X480
Note the divided middle tooth of the labial plate

Chironominae
Tribe: Chironomini

Paracladopelma sp.

View of Head X300

Paracladopelma sp.
mandible and premandible X480
Note that the basal segment of the maxillary palp is nearly as long as the 1st antennal segment.



Paracladopelma sp.
Labial plate X480 Note the median notch in the middle tooth

Chironominae
Tribe: Chironomini

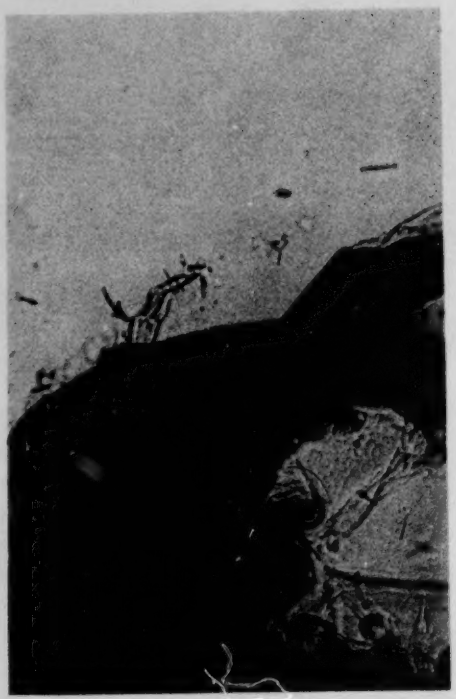
Endochironomus tendens
View of Head X75

Endochironomus tendens
Labial plate X480 Note the low middle tooth with lateral notches

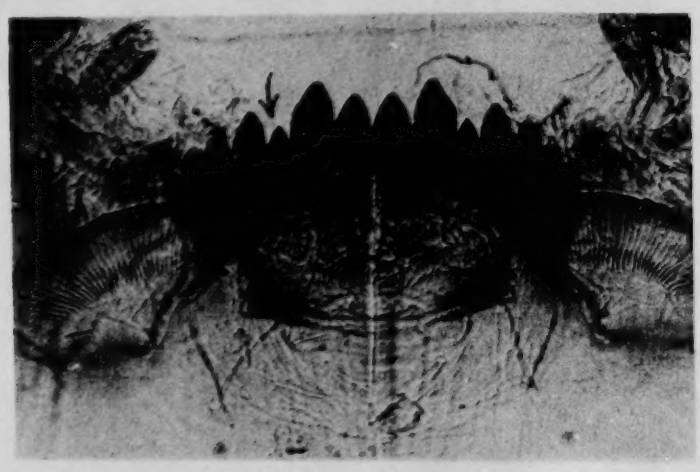
Chironominae
Tribe: Chironomini

Tribelos sp.
View of Head X75

Hamilton, et al. (1969) recognize Tribelos as a subgenus of Phaenopsectra



Tribelos sp.
Antenna X300
Note 5 segments as contrasted to 6 in Stictochironomus sp.



Tribelos sp.
Labial plate and paralabials
X300 Note the short 2nd laterals of the labial plate

Chironominae
Tribe: Chironomini

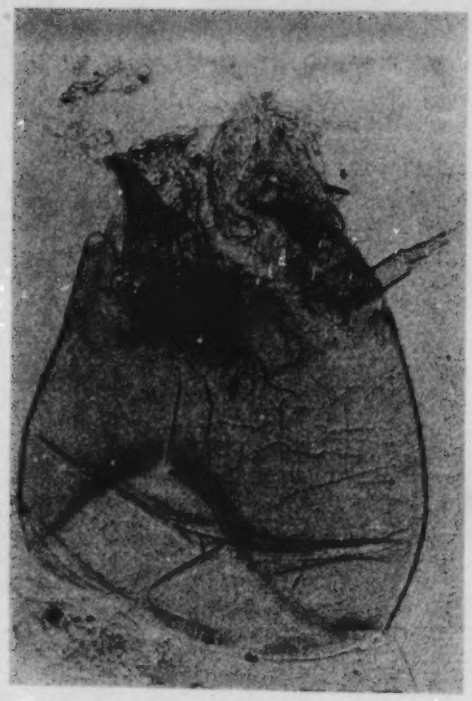
Xenochironomus sp.
View of Head X75

Xenochironomus sp.
Labial plate X190 Note the paralabials nearly touch on the midline; the low rounded teeth of the labial plate; the indistinct teeth of the mandible

Roback (1963) recognizes this group as a subgenus Anceus of Xenochironomus

Xenochironomus sp.
Premandible X300

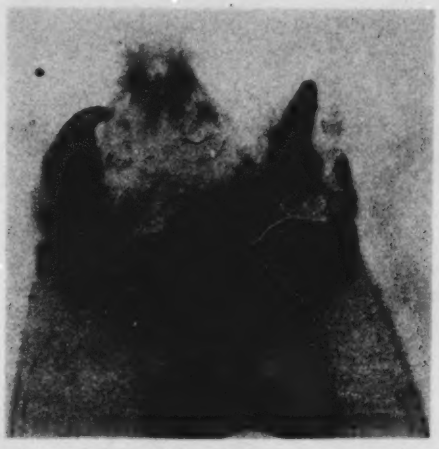
Chironominae
Tribe: Chironomini



Xenochironomus xenolabis

View of head X300

X. xenolabis
Labial plate, paralabials, and mandibles X480



X. xenolabis
More mature larva
View of Head X190

X. xenolabis
More mature larva: note that the small teeth of the labial plate are no longer present X300

Chironominae
Tribe: Chironomini

Goeldichironomus holoprasinus
View of Head X75

G. holoprasinus
Mandible X480 Note the mesal tooth perpendicular to the lateral teeth

G. holoprasinus
Hypopharynx and labial plate X300
Note the deep notches on the middle tooth of the labial plate and the 2nd laterals with light flanges

Chironominae
Tribe: Chironomini

Glyptotendipes sp. X75

Glyptotendipes sp.
Labial plate and mandible X190
Note the low, rounded middle tooth of the labial plate

Chironominae
Tribe: Chironomini

Glyptotendipes sp.
View of Head X75

Glyptotendipes sp.
Labial plate X300
Note the shallow, lateral notches on the middle tooth

Chironominae
Tribe Chironomini

Glyptotendipes senilis Joh.*
View of Head X190

*Paratype from the Cornell University Museum; specimen collected from the Hudson River at Beacon, N.Y. August 17, 1936

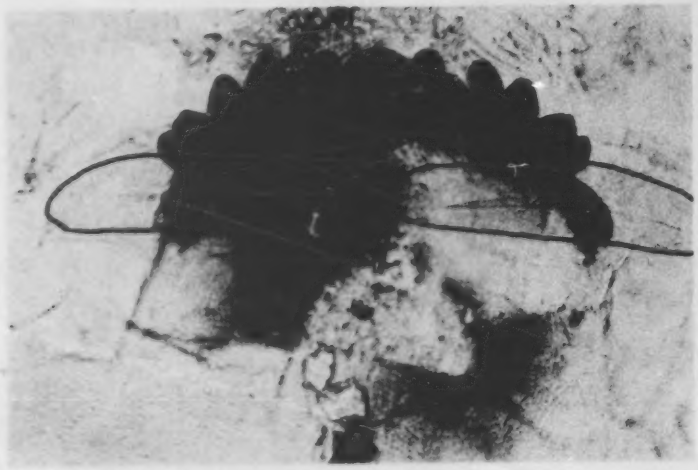
G. senilis
Mandible X480 Note that each lateral tooth differs in shape; the dorso-mesal tooth is dark and stubby

G. senilis
Labial plate and paralabials X480
Note that the 3rd and 4th laterals overlap each other; middle tooth barely notched and shorter than 1st laterals; paralabial with a fine cleft on inner margin

Chironominae
Tribe: Chironomini

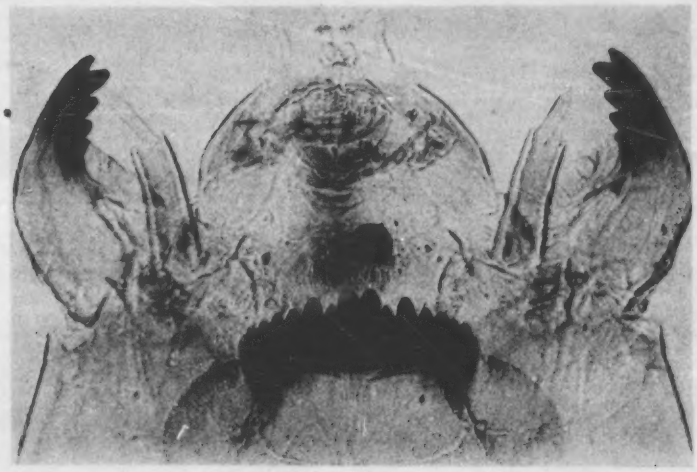
Pseudochironomus sp.
View of Head X75

Pseudochironomus sp.
Mandible and antenna X300



Pseudochironomus sp.
Labial plate and paralabials X300 Note the paralabials nearly touch on the midline

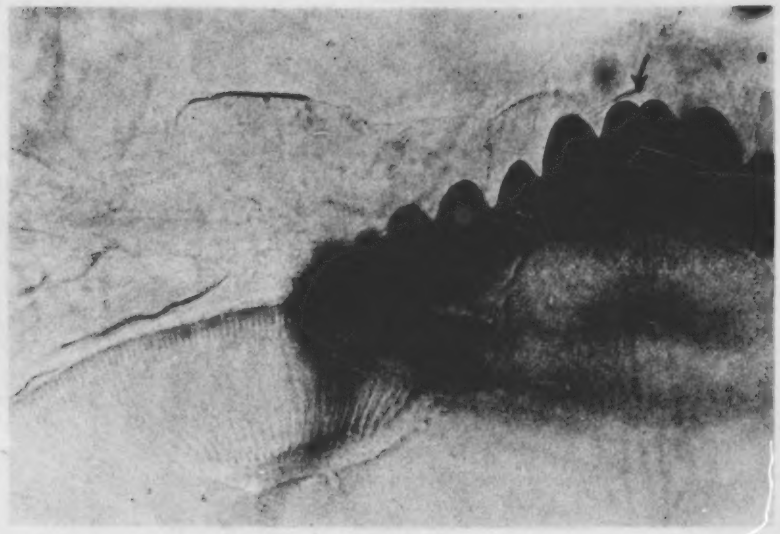
Chironominae
Tribe: Chironomini



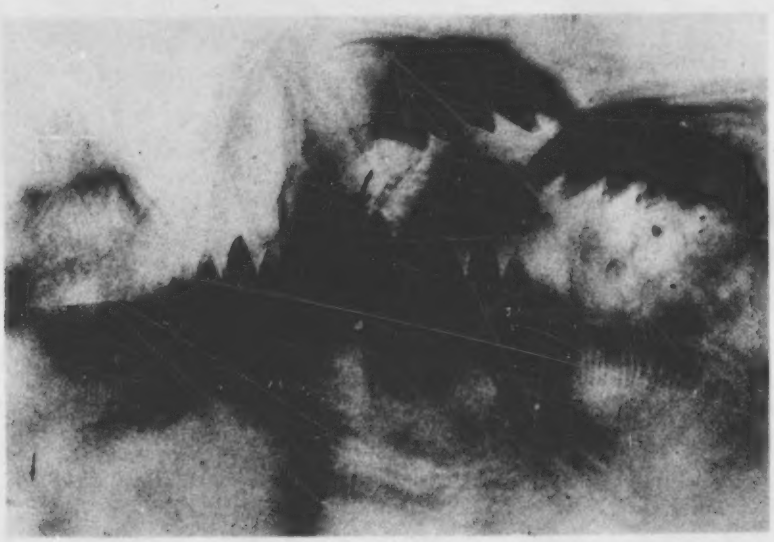
Polypedilum sp.
View of Head X300

Polypedilum sp.
Labial plate and mandible X480
Note the short 1st laterals
of the labial plate

Chironominae
Tribe: Chironomini



Endochironomus sp.
Labial plate and paralabial X480
Note the nearly fused middle teeth



Phaenopsectra sp.
Labial plate and paralabials X480
Note the middle teeth are distinctly separate, almost even in height with first laterals.

Chironominae
Tribe: Chironomini

Paralauterborniella sp.
View of Head X190

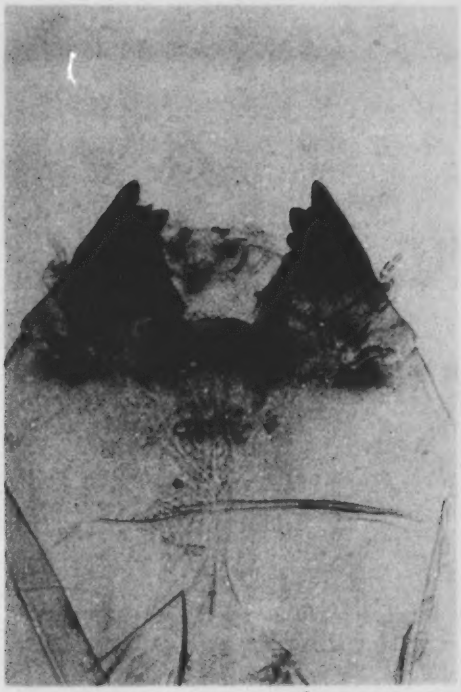
Paralauterborniella sp.
Labial plate and paralabials X480
Note the wide, light middle tooth of the labial plate, but the laterals are not oblique as in Cryptochironomus.

Chironominae
Tribe: Chironomini

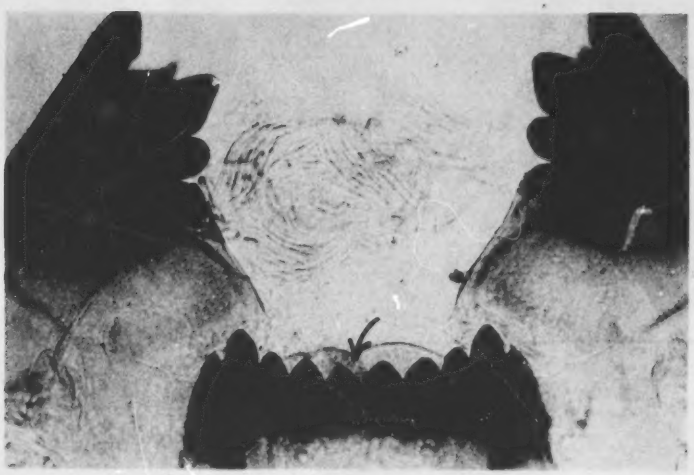
Lauterborniella sp.
View of Head X190

Lauterborniella sp.
Labial plate and paralabial plates X300 Note the long antennae and distinctive paralabials

Chironominae
Tribe Chironomini



* Stenochironomus sp. (= Cryptochironomus s. l. sp. B Joh.) View of Head X190



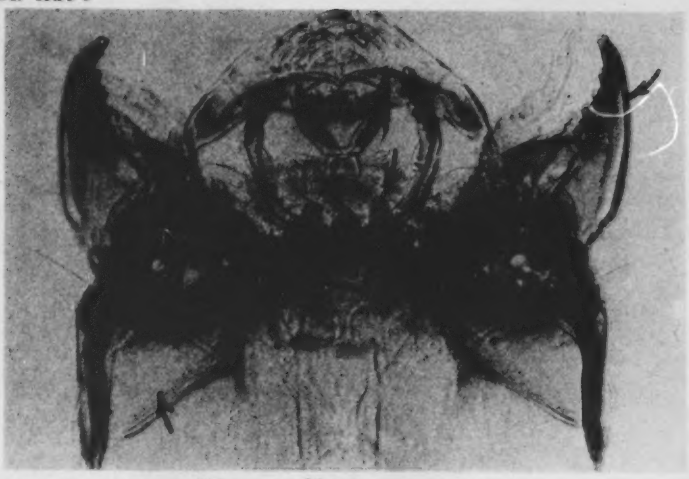
Stenochironomus sp.
Labial plate, fused paralabials, and mandibles X480 Note the concave labial plate

* Correspondence with Mr. Beck (September 20, 1967)

Chironominae
Tribe: Chironomini

* Paratendipes sp.
View of Head X190

Paratendipes sp.
Antenna X480 Note 6 segments



Paratendipes sp.
Labial plate, paralabials,
and mandibles X300

* A similar larva is given as Paratendipes "connectens No. 3" Lipina in A. A. Chernovskii's (1949) "Identification of Larvae of the Midge Family Tendipedidae" (Russia)

Chironominae
Tribe Chironomini

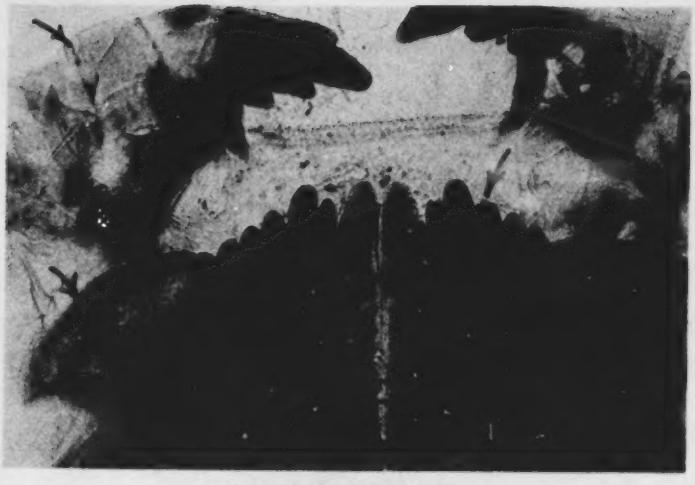
Stictochironomus sp.
View of Head X190

Stictochironomus sp.
Labial plate and paralabial plate X300 Note the 4, even middle teeth of the labial plate; the paralabial has punctations

Stictochironomus sp.
Mandible and antenna X480
Note the 6 -segmented antenna

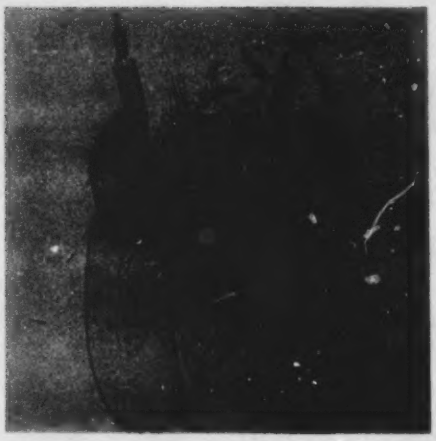
Chironominae
Tribe: Chironomini

Microtendipes sp.
View of Head X75



Microtendipes sp.
Labial plate, paralabials,
and mandibles X300

Chironominae
Tribe: Tanytarsini



Rheotanytarsus sp.
View of Head X75
Note the long, curved 1st antennal segments

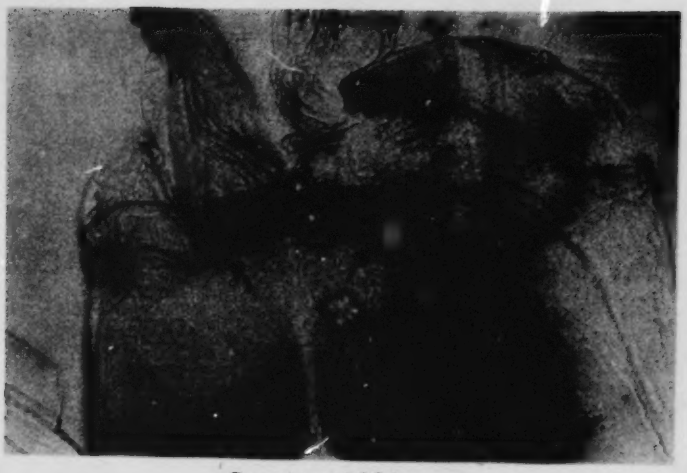
Rheotanytarsus sp.
Antennal tubercle X480
Note this distinctive character separates the Tanytarsini from the Chironomini

Rheotanytarsus sp.
Labial plate, paralabials, and mandible X480

Note: The once large genus Tanytarsus (=Calopsectra) has been split into smaller genera including; Tanytarsus, Calopsectra Paratanytarsus, Cladotanytarsus, and Rheotanytarsus. See Hamilton, et al. (1969) and Roback (1957).

Chironominae
Tribe Tanytarsini

Constempellina sp.
View of Head X300



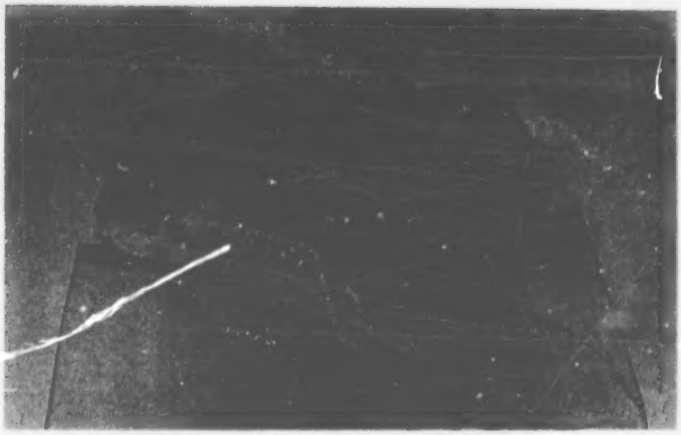
Constempellina sp.
View of Head X480
Note that the paralabials do not meet on the midline as in Rheotanytarsus sp.

Chironominae
Tribe Tanytarsini

Micropsectra sp.
View of Head X190

Micropsectra sp.
Antennal tubercle X480
Note the spur on the
tubercle

Diamesinae



Diamesa sp.
View of Head X190

Diamesa sp.
Labial plate and premandibles
X480

Diamesinae

Potthastia longimanus
View of Head X190
Note undulated labial plate.

Potthastia longimanus
Note fan-shaped premandible X480

Diamesinae

Pseudodiamesa pertinax
Head view X300

Pseudodiamesa pertinax
View mandible and premandibles
X480

Diamesinae

*Monodiamesa sp.
View of Head X190

Monodiamesa sp.
Labial plate and mandible
X480

* Correspondence with Dr. O. A. Saether, Fisheries Research Board of Canada, Freshwater Institute, Winnipeg (December, 1972)

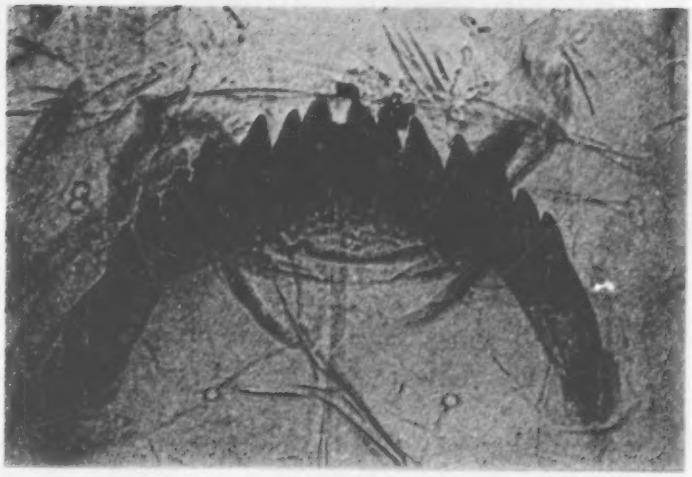
Orthocladiinae

Orthocladius sp.
View of Head X190

Orthocladius sp.
Labial plate X480
Note the even, convex appearance and round middle tooth

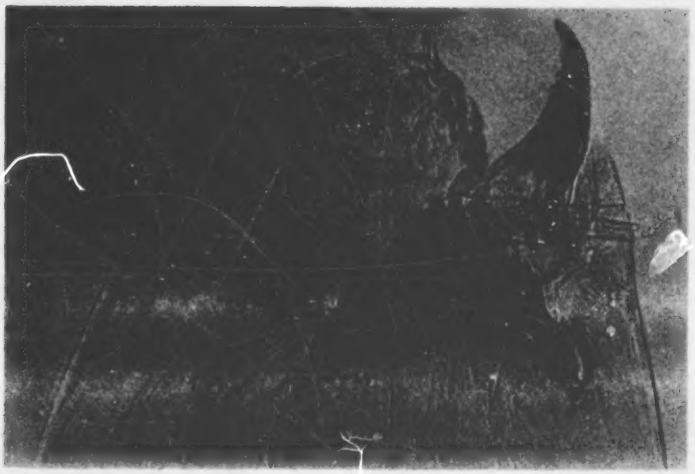
Orthocladiinae

Trissocladius sp.
View of head X190
Note the bifid premandibles



Trissocladius sp.
Labial plate X480
Note 14 teeth

Orthocladiinae



Trichocladius sp.
View of Head X300 See comments p. 24

Trichocladius sp.
Labial plate and premandibles X480
Note the separation between the spadelike middle teeth of the labial plate

Orthocladiinae

Eukiefferiella sp.
View of Head X480

Eukiefferiella sp.
View of Head X480
Note that the middle teeth of the labial plate are not as widely separated as in Trichocladius sp.

Orthocladiinae

Eukiefferiella sp.
View of Head X190

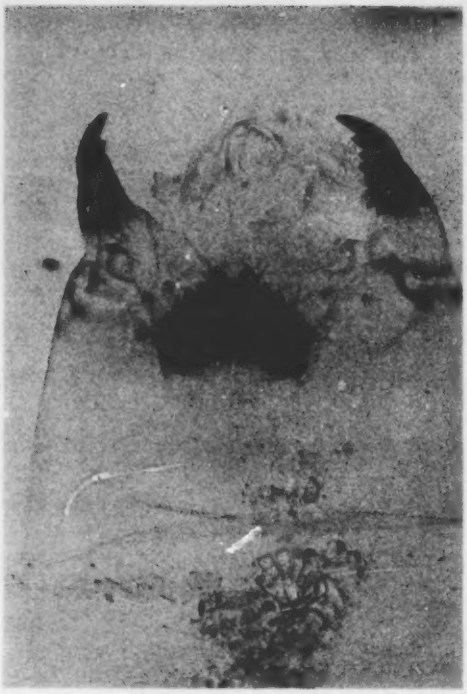
Eukiefferiella sp.
View of Head X300

Orthocladiinae

Smittia aterrima
View of Head X190

S. aterrima
Labial plate and mandibles
X480 Note labial plate with
11 teeth and large antennal blade

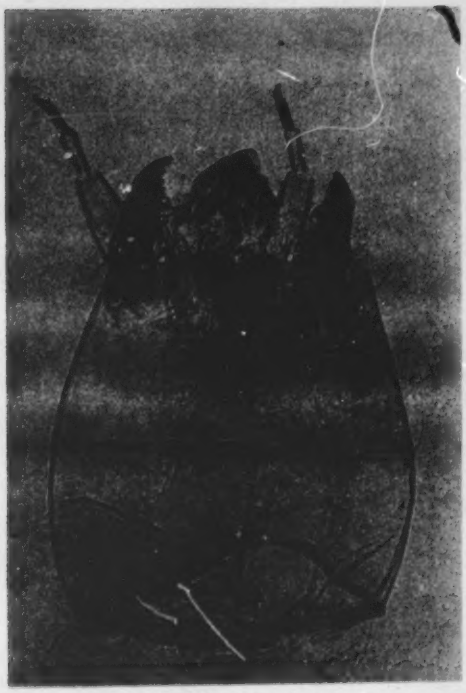
Orthocladiinae



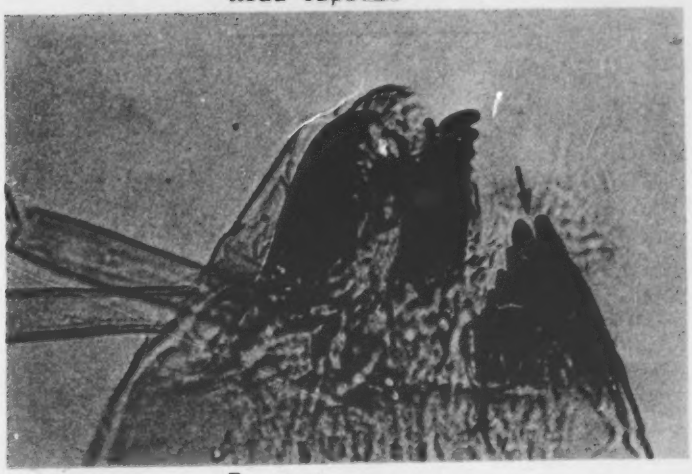
Brillia sp.
View of Head X190

Brillia sp.
Labial plate and premandibles X300 Note the small middle tooth of the labial plate

Orthocladiinae

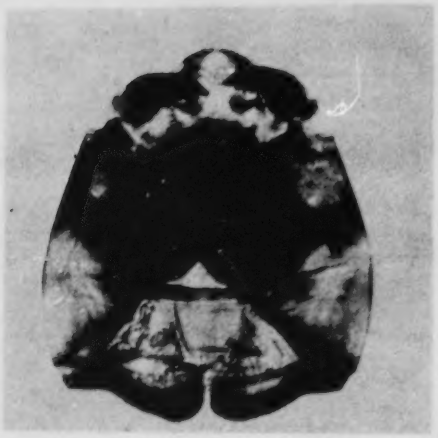


Brillia par
View of head X300
Note that the antennae are half as long as the head capsule



B. par
Lateral view of labial plate and mandibles X480 Note the distinctive gap between the middle teeth of the labial plate

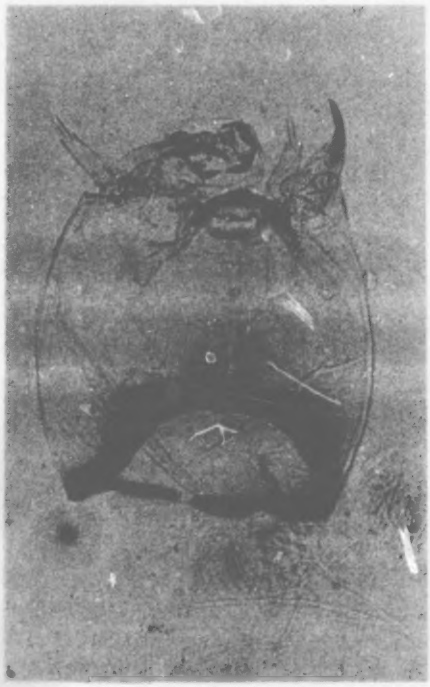
Orthocladiinae



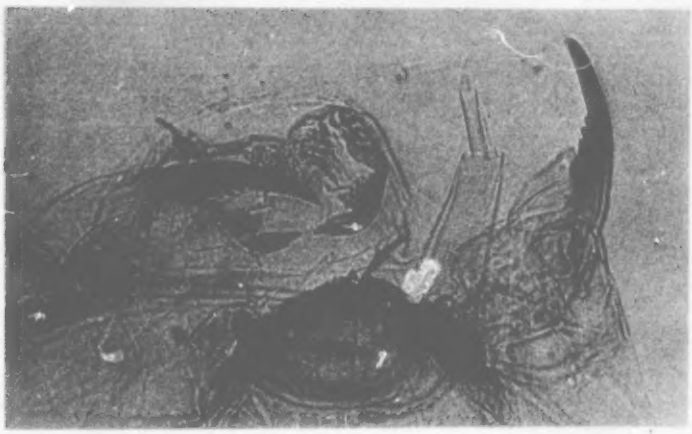
Cardiocladius sp.
View of Head X75

Cardiocladius sp.
Labial plate and mandibles X300

Orthocladiinae



Psectrocladius sp.
View of head X190



Psectrocladius sp.
Labial plate and mandibles X480
Note the scythe-shaped mandibles and the small, dark tips on the light middle teeth of the labial plate

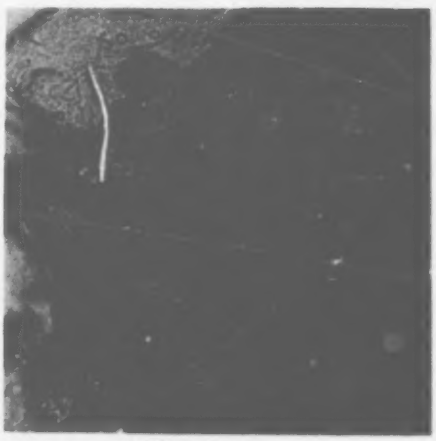
Orthocladiinae

Psectrocladius sp.
View of head X480
Note the wide, light, dome-shaped middle tooth of the labial plate; the darker lateral teeth are hidden underneath the paralabial plates

Orthocladiinae

Psectrocladius sp.
View of Head X190

Psectrocladius sp.
Labial plate and mandible X300



Psectrocladius sp.
Premandibles and labral spines X480

Orthocladiinae

Heterotrissocladius sp.*
View of Head X190

Heterotrissocladius sp.
Antenna X480

* Heterotrissocladius larvae have six-segmented antennae; the third one greatly reduced and sometimes withdrawn into the second segment; the last two segments are small.
Correspondence with Dr. A. L. Hamilton, Eutrophication Section, Fisheries Research Board of Canada, Winnipeg, Manitoba (January, 1969).

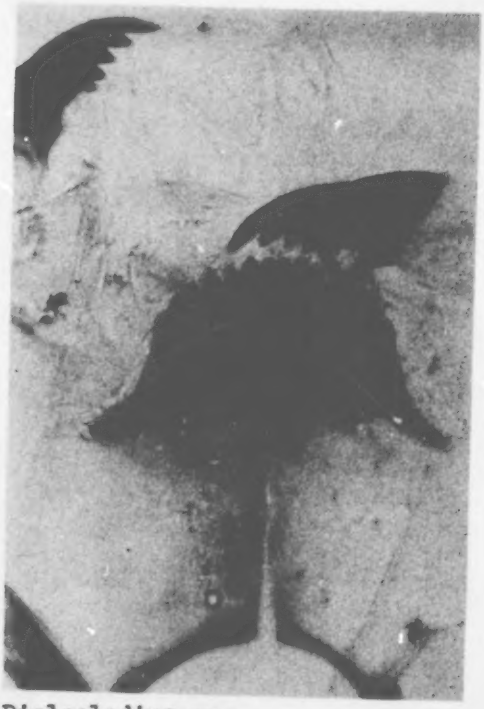
Orthocladiinae

Metriocnemus sp.
View of Head X190

Metriocnemus sp.
Labial plate and mandible
X480

Orthocladiinae

Diplocladius sp.
View of Head X190



Diplocladius sp.
Labial plate and mandibles
X300 Note the relatively even teeth of the labial plate

Orthocladiinae

Cricotopus sp.
View of Head X190

Cricotopus sp.
Mandible X480 Note the serrations on the inner margin

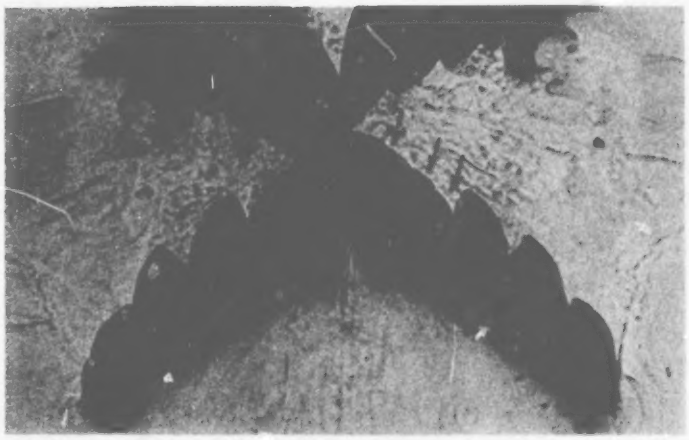
Orthocladiinae

Cricotopus sp.
View of Head X190

Cricotopus sp.
Mandible and premandible X480
Note the crenulations on the outer margin of the mandible

Orthocladiinae

Cricotopus sp.
View of Head X190
Note that the labial plate apparently has 7 teeth (see below)



Cricotopus sp.
Labial plate X480
Note that the middle tooth is actually composed of 5 teeth

Orthocladiinae

Thienemanniella sp.
View of Head X300

Thienemanniella sp. X480
Note the elongate antennae with dark 1st and 2nd segments; the minute middle tooth of the labial plate.

Thienemanniella and Corynoneura are similar in general appearance except that the antennae are longer than the head capsule in Corynoneura and shorter than the head capsule in Thienemanniella

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